Charles Darwin University

Final Examination

Family Name						
Given Name/s						
Student Number						
Teaching Period	Semester 2, 2017					

ENG417 – Sustainability	DURATION	
	Reading Time:	10 minutes
	Writing Time:	180 minutes

INSTRUCTIONS TO CANDIDATES

The examination has one (1) section with four (4) questions: answer all four (4) questions.

Please write your answers in the booklet provided.

Please ensure that your name and student number are clearly indicated on your answers and at the top of this examination paper.

Note that all questions ARE of equal value (25 marks each).

This examination accounts for a total of 45 % of the marks available for this unit.

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a RESTRICTED OPEN BOOK examination

Any non-programmable calculator is permitted

No handwritten notes are permitted

Hard copy, unannotated English translation dictionary only

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted	1 x 20 Page Book

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

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Question 1. (25 marks)

The Institution of Chemical Engineers sustainability metrics[1] are presented in the following three groups:

1 Environmental indicators

2 Economic indicators

3 Social indicators

to reflect the three components of sustainable development.

With reference to an engineering process, or an information technology system, explain the application of these three groups of metrics in practice.

Reference

1 IChemE (2002). The Sustainability Metrics. The Institution of Chemical Engineers, Rugby, UK.

Question 2. (25 marks)

Analyse the effects on the local, and national, economies of the long-term decision to cease uranium ore mining operations at the Energy Resources Australia site on the border of the World Heritage listed Kakadu National Park.

Question 3. (25 marks)

Explain the potential implications of the decadal change in maximum temperature shown in Fig. Q. 3 on the Northern Territory's future demand for water.

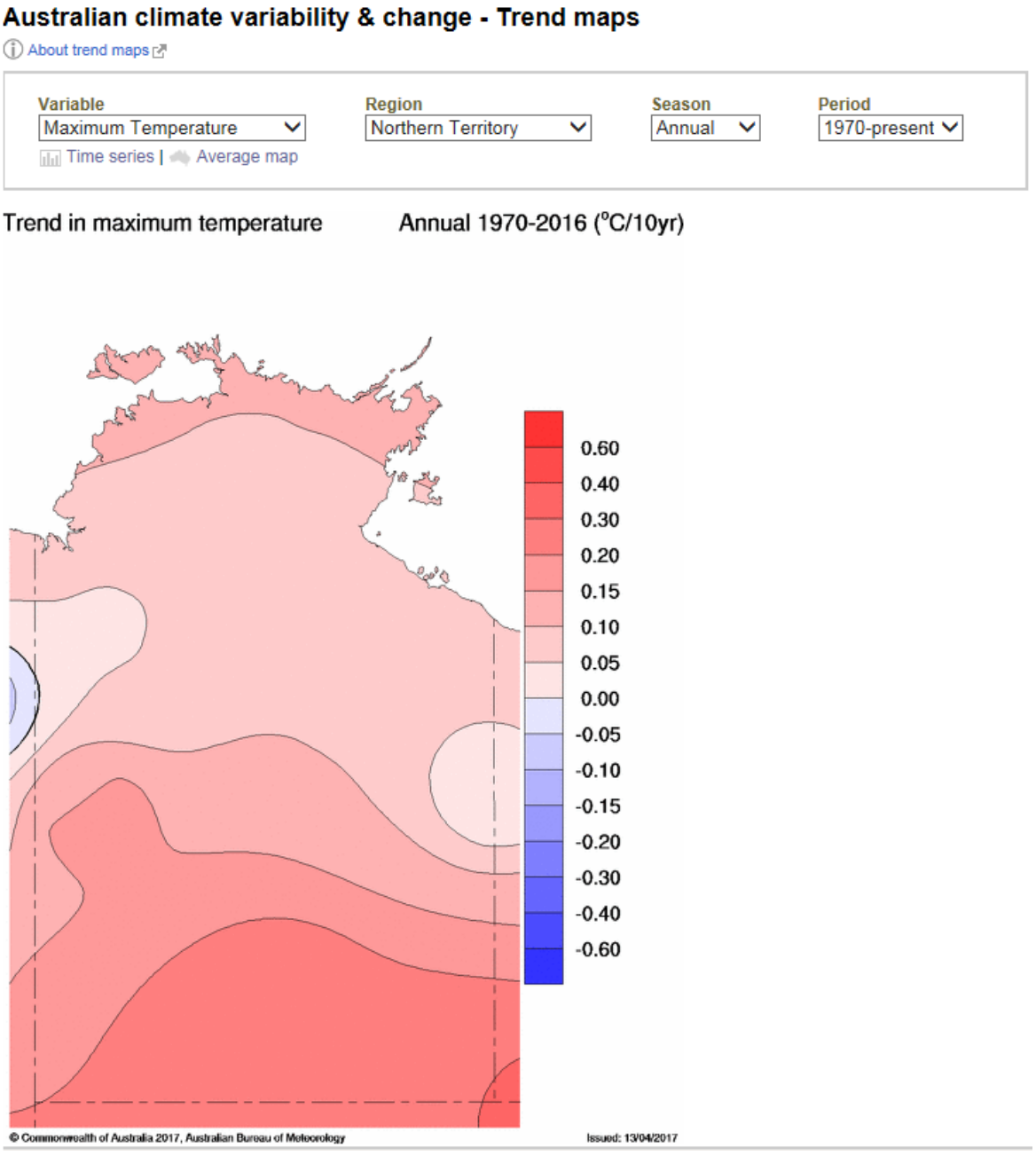

Fig. Q. 3 Trend in maximum temperature (1 Jan., 1970 to 30 July, 2017): NT, Australia[2]

Reference

2 Commonwealth of Australia (2017) Australian climate variability & change - Time series graphs. Bureau of Meteorology.

Question 4. (25 marks)

For the T-junction shown in Fig. Q. 4 assess the long-term sustainability of the proposed traffic light sequence.

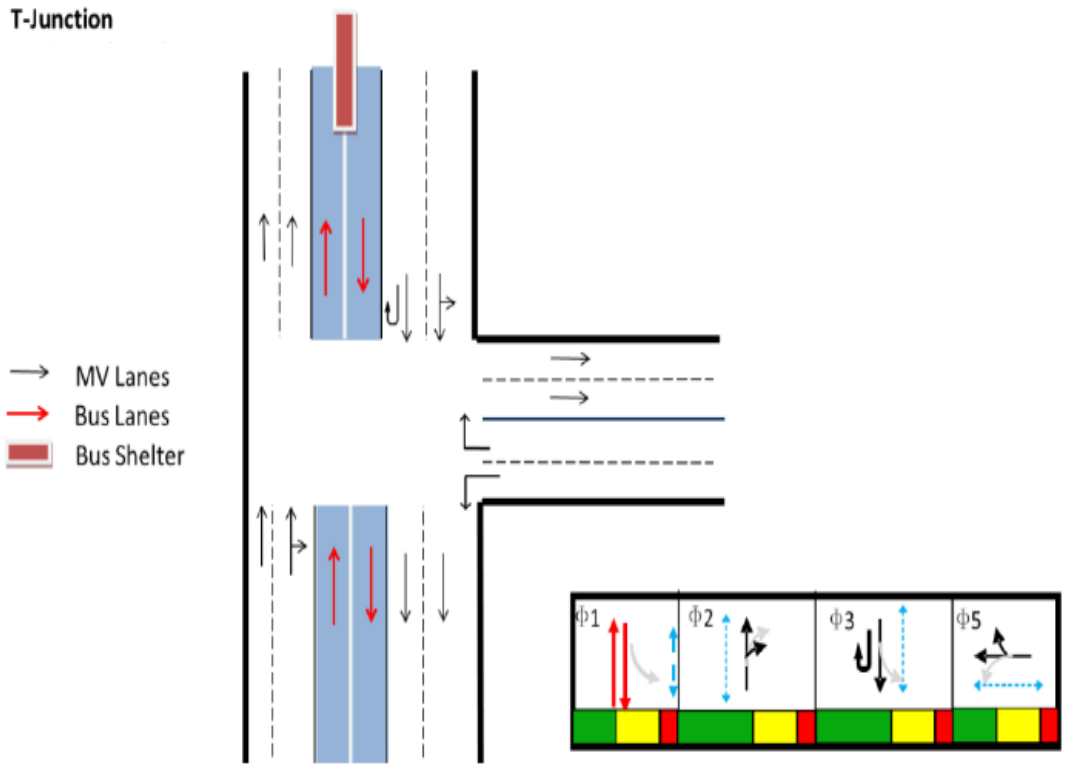

Fig. Q. 4 Typical traffic light cycle (Phases Φ1 to Φ5, where Phase Φ4 is red to ***all*** traffic, green to pedestrians only) at a 3-way intersection (with exclusive motor vehicle (MV) lanes) and a bus shelter[3]

Reference

3 Shakti Sustainable Energy Foundation (2016) Best practices for traffic signal operations in India. A report prepared by: IBI Consultancy India Pvt Ltd. Mumbai, India.